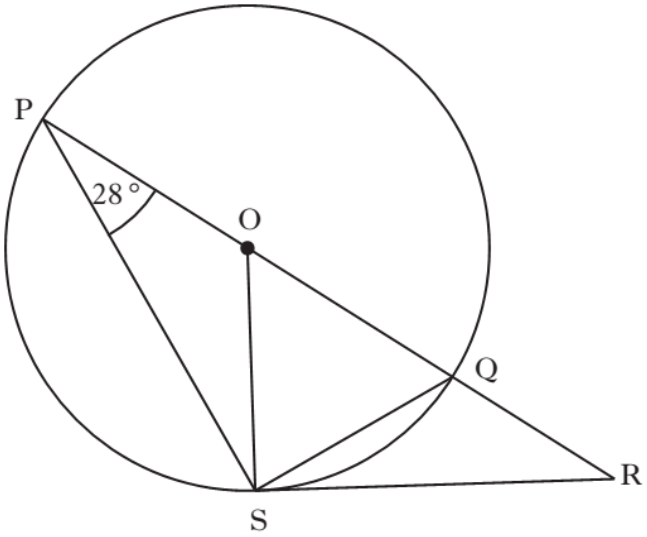
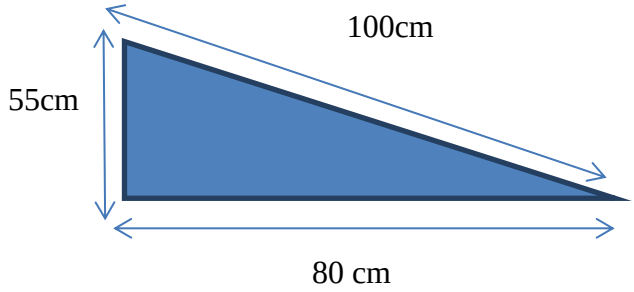
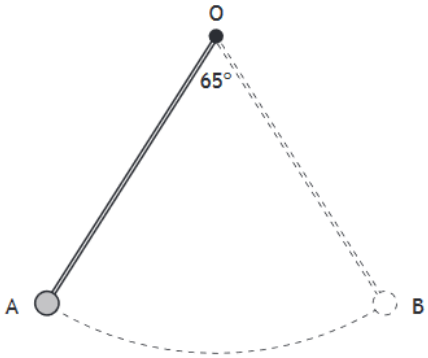
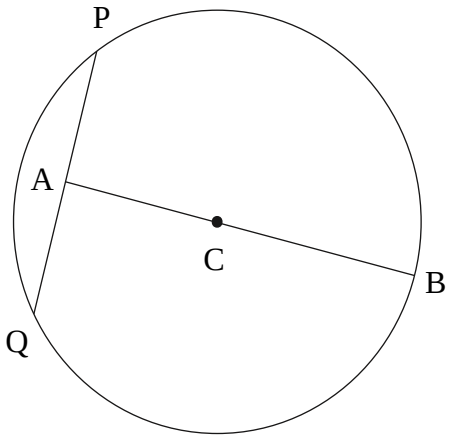
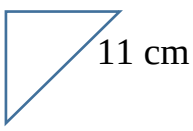
S4	December A/B Revision 2 – Non Calculator	**20**
1	Multiply out the brackets and collect like terms $(2x+5)(x^2-3x+1)$	**3**
2	Solve the equation $\frac{x}{6}-\frac{1}{2}=5$	**2**
3	Calculate the median and the semi-interquartile range for this data set 18 16 26 24 14 16 19 20 27 30	**2**
4	Solve algebraically the system of equations $2x+3y=3$ $5x+2y=13$	**3**
5	Express $\frac{2}{x+1}+\frac{3}{x-1}$, $x \neq -1,\ x \neq 1$ as a single fraction in its simplest form	**3**
6	Express $\frac{6}{\sqrt{2}}$ with a rational denominator in its simplest form	**2**
7	A parabola has equation $y=x^2-6x+11$ (a) Write the equation of the parabola in the form $y=(x-a)^2+b$ (b) State the coordinates of (i) The turning point of this parabola (ii) The point of intersection with the *y*-axis	**2** **2** **1**

S4	November A/B Revision 2 – Calculator	**30**
1	Amir normally runs a total distance of 42 miles per week. Over the next four weeks he intends to increase his distance by 8% per week. How many miles will Amir run in his fourth week	**3**
2	Jupiter's largest moon Io has a radius of approximately 1823 km. Calculate the volume of Io. Give your answer in scientific notation correct to **two significant figures.**	**2**
3	 In this diagram • O is the centre of the circle • PQ is a diameter of the circle • PQR is a straight line • RS is a tangent to the circle at S • Angle OPS is 28° Calculate the size of angle QRS	**3**
4	(a) Factorise $4x^2 - 1$ (b) Hence find the roots of the equation $4x^2 - 1 = 0$	**2** **2**
5	Change the subject of the formula $l = \sqrt{2t - a}$ to t	**3**

6	A triangular tile has measurements as shown.  Is this tile in the shape of a right-angled triangle?	**3**
7	A straight line has an equation $5x + 2y = 20$ (a) What is the gradient of this straight line	**2**
	(b) State the coordinates of the x-intercept of this straight line	**2**
8	The pendulum of a clock swings along an arc of a circle, centre O  The pendulum swings through an angle of 65°. The length of the arc AB is 30 centimetres. Calculate the length of the pendulum.	**4**
9	The radius of the circle with centre C is 11 centimetres. A is the midpoint of chord PQ The length of line AB is 18 centimetres Calculate the length of chord PQ  	**4**

	Revision 2 Non Calculator Answers
1	$(2x+5)(x^2-3x+1) = 2x^3-6x^2+2x+5x^2-15x+5 \;= 2x^3-x^2-13x+5$
2	$\frac{x}{6}-\frac{1}{2}=5$, multiply through by 6 $\quad x-3=30, \quad \boldsymbol{x=33}$
3	Median is 19.5 $\quad Q_1$ is 16, Q_3 is 26 $\quad$ SIQR is 5
4	$2x+3y=3$ $\qquad$ Scale $\qquad$ $10x+15y=15$ $5x+2y=13$ $\qquad\qquad\qquad\qquad$ $10x+4y=26$ $11y=-11, \quad \boldsymbol{y=-1, x=3}$
5	$\dfrac{2}{x+1}+\dfrac{3}{x-1}=\dfrac{2(x-1)+3(x+1)}{(x+1)(x-1)}=\dfrac{5x+1}{(x+1)(x-1)}$
6	$\dfrac{6}{\sqrt{2}}=\dfrac{6\sqrt{2}}{2}=3\sqrt{2}$
7	(a) $x^2-6x+11=(x-3)^2+2$ (b) Turning point is $(3,2)$, y-intercept is $(0,11)$

	Revision 2 Calculator Answers
1	$42\times 1.08^4 = 57.14053$ $\qquad$ **57 miles**
2	$V=\frac{4}{3}\times\pi\times 1823^3 \;= 2.537748709\times 10^{10} = \boldsymbol{2.5\times 10^{10}}$ **km**^{3}
3	$POS = 180° - 2\times 28° = 124°$, $SOQ = 180° - 124° = 56°$, $\qquad\qquad$ $QRS = 90° - 56° = \boldsymbol{34°}$
4	(a) $4x^2-1=(2x+1)(2x-1)$ (b) $(2x+1)(2x-1)=0, \quad x=-\frac{1}{2}$ or $x=\frac{1}{2}$
5	$l=\sqrt{2t-a} \quad\rightarrow\quad l^2=2t-a \quad\rightarrow\quad l^2+a=2t \quad\rightarrow\quad \boldsymbol{t=\frac{l^2+a}{2}}$
6	For right-angled triangles $c^2=a^2+b^2$, $100^2=55^2+80^2$, $\quad 100^2=10000, \;\; 55^2+80^2=9425$ $10000 \neq 9425$, so by the Converse of Pythagoras this tile is not a right-angle triangle
7	(a) $5x+2y=20, \quad y=-\frac{5}{2}x+20$ $\quad$ gradient is $-\frac{5}{2}$ (b) $x-$ intercept, $\quad y=0, \;\; 5x=20, \;\; x=4 \qquad (\boldsymbol{4,0})$
8	$Arc=\frac{\theta}{360°}\times\pi D, \quad 30=\frac{65°}{360}\times\pi D, \quad \frac{10800}{65\times\pi}=D, \quad D=52.888$ cm, The length of the pendulum is $52.888\div 2 = \boldsymbol{26.4}$ **cm**
9	Establish a right-angled triangle  Use Pythagoras $PA=\sqrt{11^2-7^2}=8.458\,cm$ PQ is $2\times PA = 16.97 = 17\,cm$